

**New species and new records of *Popovastrongylus* Mawson, 1977  
(Nematoda, Cloacininae)  
from Australian marsupials**

by Ian BEVERIDGE

**Abstract.** — The following new species of *Popovastrongylus* Mawson, 1977 (Nematoda, Cloacininae) are described : *P. macropodis* sp. n. from the stomach of *Macropus giganteus* Shaw, 1790, *M. robustus* Gould, 1841, and *M. rufus* (Desmarest, 1822) from north Queensland, and *P. thylogale* sp. n. from *Thylogale stigmatica* Gould, 1860, *T. brunii* (Schreber, 1778) and *Petrogale persephone* Maynes, 1982 from Queensland and Papua-New Guinea. The cephalic anatomy of *P. pearsoni* (Johnston & Mawson, 1940) is described from material collected from *Macropus fuliginosus* (Desmarest, 1817), a new host record.

**Résumé.** — Deux nouvelles espèces de *Popovastrongylus* Mawson, 1977 (Nematoda, Cloacininae) sont décrites : *P. macropodis* sp. n. parasite de l'estomac de *Macropus giganteus* Shaw, 1790, *M. robustus* Gould, 1841, et *M. rufus* (Desmarest, 1822) du Queensland, et *P. thylogale* sp. n. parasite de l'estomac de *Thylogale stigmatica* Gould, 1860, *T. brunii* (Schreber, 1778) et *Petrogale persephone* Maynes, 1982, du Queensland et de Papouasie. L'anatomie céphalique de *P. pearsoni* (Johnston & Mawson, 1940) est redécrite à partir de matériel provenant de *Macropus fuliginosus* (Desmarest, 1817), un nouvel hôte pour le nématode.

I. BEVERIDGE, *Laboratoire des Vers, associé au CNRS, Muséum national d'Histoire naturelle, 61, rue Buffon, 75231 Paris cedex 05.*

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The genus *Popovastrongylus* Mawson, 1977, currently contains three species : *P. wallabiae* (Johnston & Mawson, 1939) (type species), *P. pearsoni* (Johnston & Mawson, 1940) and *P. irma* Mawson, 1977, all parasitic in the stomach of wallabies belonging to the genera *Macropus* and *Wallabia*. In this paper, two new species are described and *P. pearsoni* is reported from a new host species.

Specimens examined have been deposited in the collections of the South Australian Museum, Adelaide (SAM), the Muséum national d'Histoire naturelle, Paris (MNHN), the Australian helminthological collection, Adelaide (AHC), and the CSIRO Division of Wildlife and Rangelands Research, Canberra (WL). Measurements given in the text are the range for five specimens followed by the mean in parentheses. If fewer than five specimens were available, measurements are given individually. Measurements are in millimetres.

**Popovastrongylus macropodis** sp. n.

(Fig. 1)

TYPES : Holotype ♂, from *Macropus giganteus* Shaw, 1790, Pallamana Station via Charters Towers, Queensland, 28.III.1983, coll. R. SPEARE, in SAM no V3632 ; allotype ♀, same host, Harvest Home Station via Charters Towers, Queensland, 29.III.1983, coll. R. SPEARE, in SAM no V3633 ; paratypes, 2 ♀, same data, in AHC nos 13378, 13379.

LOCATION IN HOST : Stomach.

MATERIAL EXAMINED : From *Macropus giganteus* : types. — From *Macropus robustus* Gould, 1841 : 7 ♀, Pallamana Station via Charters Towers, Queensland, 28.III.1983, coll. R. SPEARE (AHC nos 13359, 13360 ; MNHN no 529HD). — From *Macropus rufus* (Desmarest, 1822) : 1 ♀, Molesworth, Queensland, I.VIII.1979, coll. R. SPEARE (AHC 6444).

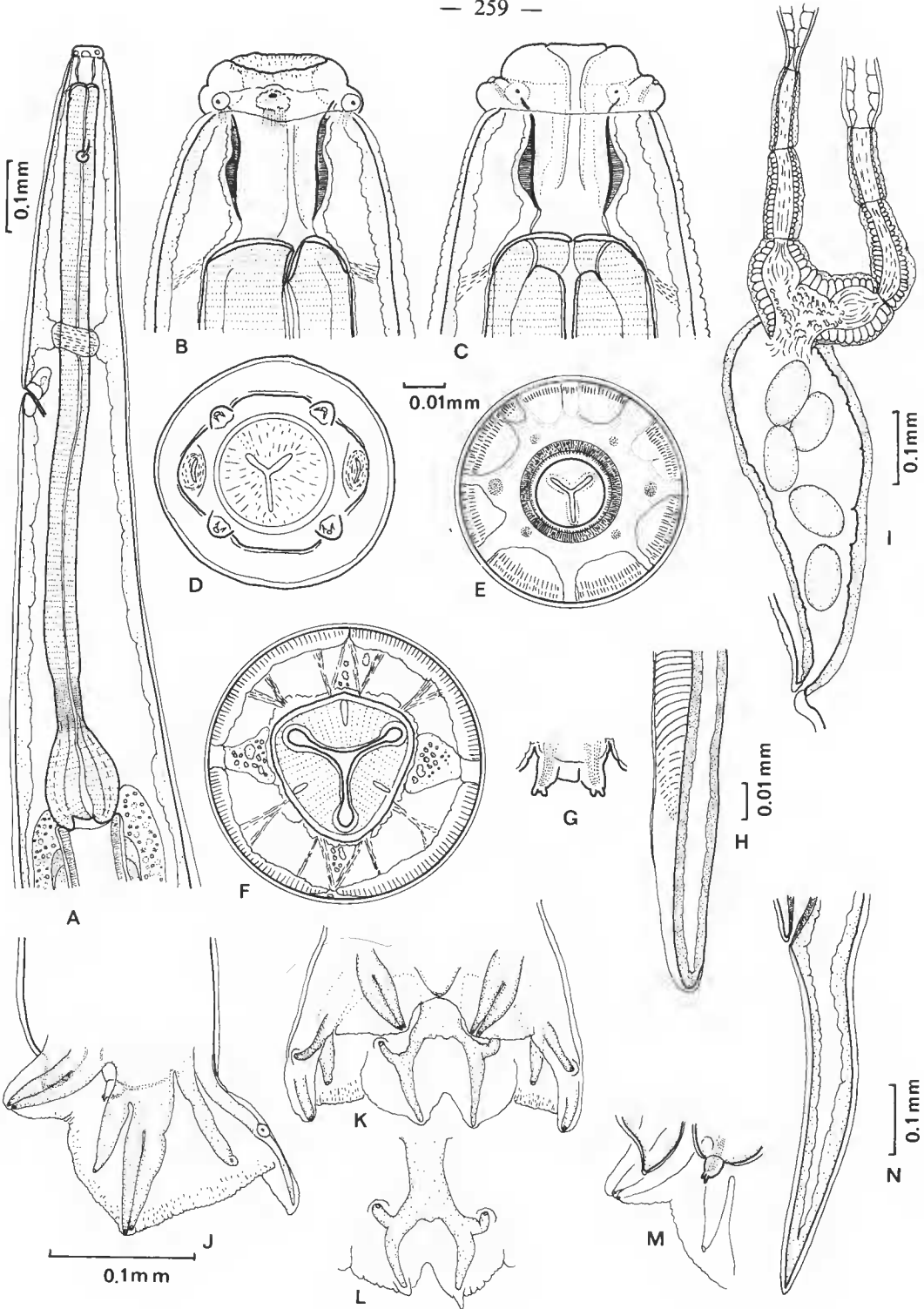
DESCRIPTION

Small worms ; body covered with numerous fine, transverse striations ; mouth opening small, subtriangular, on a distinct elevated collar ; cephalic collar present posterior to collar bearing mouth opening, with 2 amphids and 4 radially-directed domed submedian papillae, each with 2 tiny setae, visible only in apical view at high magnification. Buccal capsule approximately cylindrical, longer than wide ; walls narrow, sclerotised, refractile with thickened annulus in posterior half ; membranous lining of buccal capsule inflated, almost occluding lumen ; lumen triangular. Oesophageal corpus long, cylindrical, attached at anterior extremity to somatic muscles by small muscle bands ; isthmus short ; oesophageal bulb sub-spherical ; anterior extremity of intestine not dilated or thickened ; nerve ring in anterior oesophageal region ; deirids anterior to nerve ring ; excretory pore in mid-oesophageal region, posterior to nerve ring.

*Male* : Length 7.8 ; width 0.31 ; buccal capsule  $0.037 \times 0.030$  ; oesophagus 0.97 ; nerve ring to anterior end 0.39 ; deirids to anterior end 0.16 ; excretory pore to anterior end 0.55 ; spicules 1.01. Lobes of bursa of approximately equal length ; lateral lobes with fine radially-arranged striae close to margin ; sclerotised bosses absent. Ventral rays apposed, reach margin of bursa ; posterolateral and mediolateral rays apposed, reach margin of bursa ; externolateral ray short, divergent, not reaching margin of bursa ; externodorsal ray arises close to lateral trunk, not reaching margin of bursa ; dorsal ray broad at origin, dividing at mid-length into 2 arcuate branches which reach margin of bursa ; lateral branches of dorsal ray short, arise soon after main bifurcation, terminate in small elevations on internal surface of bursa. Anterior lip of genital cone small, conical, with single apical papilla ; posterior lip with 2 bilobed appendages. Spicules elongate, alate ; tips

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FIG. 1. — *Popovastrongylus macropodis* sp. n. : A, oesophageal region, lateral view ; B, cephalic end, lateral view ; C, cephalic end, ventral view ; D, mouth opening, apical view ; E, optical transverse section through buccal capsule ; F, optical transverse section through anterior extremity of oesophagus, showing muscles attaching oesophagus to somatic musculature ; G, posterior lip of genital cone, dorsal view ; H, spicule tip, lateral view ; I, ovejector and vagina vera, lateral view ; J, bursa, lateral view ; K, bursa, ventral view ; L, dorsal lobe of bursa, dorsal view ; M, genital cone, lateral view ; N, female tail, lateral view. (Scale lines : figs B, C, D, E, F, G, H, to same scale ; figs J, K, L, M, to same scale.)



blunt ; ala transversely striated, diminishes gradually in width towards spicule tip ; gubernaculum absent ; central cordate and two lateral elongate thickenings of spicule sheaths present.

*Female* (measurements of types) : Length 7.4, 7.4, 8.8. ; width 0.34, 0.36, 0.36 ; buccal capsule 0.035, 0.035, 0.040 × 0.030, 0.030, 0.030 ; oesophagus 0.92, 1.09, 1.12 ; nerve ring to anterior end 0.38, 0.38, 0.42 ; deirids to anterior end 0.28, 0.31 ; excretory pore to anterior end 0.45, 0.49, 0.56 ; tail 0.40, 0.50, 0.53 ; vulva to posterior end 0.66, 0.79, 0.81 ; vagina vera 0.36, 0.37, 0.40 ; egg 0.09, 0.09, 0.10 × 0.04, 0.05, 0.05. Tail long, slender, tapering ; vulva immediately anterior to anus ; vagina vera short, broad at anterior end ; vestibule obliquely disposed ; egg ellipsoidal.

#### DISCUSSION

In spite of the presence of only a single male, the new species is readily distinguished from all other species by cephalic morphology alone. The lack of a shelf in the buccal capsule separates the new species from *P. wallabiae* and *P. pearsoni* while the double cephalic collar and long narrow buccal capsule separates it from *P. irma*. Buccal capsule shape and the absence of striations on the buccal capsule separate the new species from *P. thylogale* sp. n. described below, while the tri-radiate mouth opening separates *P. macropodis* from all congeners.

*P. macropodis* was encountered in three macropodid species from north Queensland, but was uncommon, with only one or two nematodes present among the several hundred examined from each individual host. *Macropus giganteus* was selected as the type host as the single male came from this host species. A further male and four females from *M. rufus* have been examined by the writer in 1979 but have since been lost.

#### **Popovastrongylus thylogale** sp. n.

(Fig. 2)

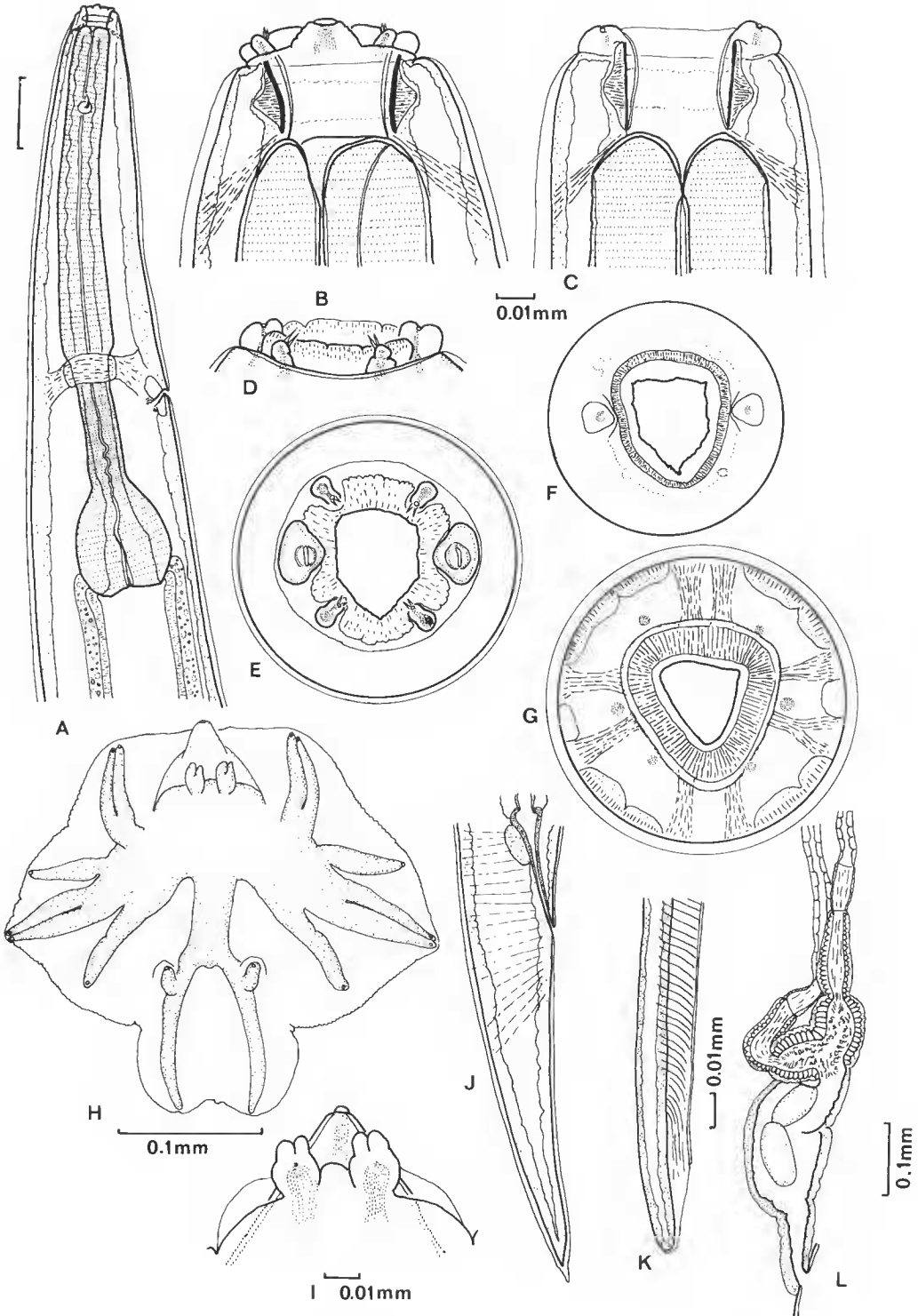
TYPES : Holotype ♂, allotype ♀, from *Thylogale stigmatica* Gould, 1860, Wongabel State Forest, near Atherton, Queensland, July, 1982, coll. S. HOUSE, in SAM nos V3639, 3640 ; paratypes, same data, 2 ♂, 2 ♀, in SAM nos 3641-3644 ; 2 ♂, 2 ♀, in MNHN no 533HD ; 5 ♂, 1 ♀, in AHC 12350.

LOCATION IN HOST : Stomach.

MATERIAL EXAMINED : From *Thylogale stigmatica* : types. — From *Thylogale brunii* (Schreber, 1778) : 5 ♂, 5 ♀, Mt. Edward Albert, Papua-New Guinea, December, 1981, coll T. FLANNERY (AHC 11822). — From *Petrogale persephone* Maynes, 1982 : 1 ♂, 4 ♀, Proserpine, Queensland, 7.III.1978, coll. P. M. JOHNSON and D. M. SPRATT (WL N511).

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FIG. 2. — *Popovastrongylus thylogale* sp. n. : A, oesophageal region, lateral view ; B, cephalic end, lateral view ; C, cephalic end, median view ; D, cephalic papillae, median view ; E, mouth opening, apical view ; F, optical transverse section through anterior part of buccal capsule ; G, optical transverse section through buccal capsule at level of annulus ; H, bursa, apical view ; I, genital cone, dorsal view ; J, female tail, lateral view ; K, spicule tip, lateral view ; L, vagina vera and ovejector, lateral view. (Scale lines : figs B, C, D, E, F, G, to same scale ; figs H, J, to same scale.)



## DESCRIPTION

Small worms ; body covered with numerous fine transverse striations ; mouth opening pentagonal to triangular in shape, with base of pentagon dorsal ; mouth opening surrounded by elevated, finely striated collar, indented on external margin by amphids and cephalic papillae ; amphids on prominent elevated projections ; submedian papillae with 2 short, medially-directed setae ; papillae situated on broad cephalic collar. Buccal capsule approximately cylindrical in median and lateral views, with annular thickening around middle ; internal lining of buccal capsule transparent, non-refractile ; outer part sclerotised, refractile, with prominent radial striae ; buccal capsule pentagonal or triangular in transverse section at mouth opening with same orientation as mouth ; at level of annulus, buccal capsule triangular in section, with base of triangle dorsal. Oesophageal corpus elongate, cylindrical, anterior extremity attached to somatic musculature by 8 small muscle bands ; isthmus long, distinct ; oesophageal bulb sub-spherical ; anterior extremity of intestine not dilated or thickened ; nerve ring at junction of oesophageal corpus with isthmus ; deirids in anterior oesophageal region ; excretory pore immediately posterior to nerve ring.

*Male* : Length 5.0-5.8(5.4) ; width 0.27-0.33(0.31) ; buccal capsule 0.020-0.030(0.025)  $\times$  0.040-0.050(0.046) ; oesophagus 0.83-0.89(0.86) ; nerve ring to anterior end 0.53-0.57(0.55) ; deirids to anterior end 0.13-0.17(0.16) ; excretory pore to anterior end 0.58-0.66(0.60) ; spicules 0.90-0.96(0.93). Dorsal lobe of bursa slightly longer than lateral lobes ; lateral lobes with fine radially-arranged striae close to margin of bursa ; sclerotised bosses absent. Ventral rays apposed, reach margin of bursa ; posterolateral and mediolateral rays apposed, reach margin of bursa ; externolateral ray shorter, divergent, almost reaching margin of bursa ; externodorsal ray arises close to lateral trunk, not reaching margin of bursa ; dorsal ray long, slender at origin, dividing at midlength into 2 slender arcuate branches, reaching margin of bursa ; lateral branches of dorsal ray short, arise immediately after main bifurcation, terminate in 2 projections on internal surface of bursa. Anterior lip of genital cone large, conical, with single apical papilla ; dorsal lip with 2 bilobed projections. Spicules elongate, alate, tips blunt ; alae striated, diminish in width towards spicule tip ; gubernaculum absent ; central cordate and 2 lateral elongate thickenings of spicule sheaths present.

*Female* : Length 6.2-6.4(6.3) ; width 0.32-0.38(0.36) ; buccal capsule 0.020-0.030(0.025)  $\times$  0.050-0.060(0.055) ; oesophagus 0.90-0.93(0.91) ; nerve ring to anterior end 0.55-0.59(0.57) ; deirids to anterior end 0.15-0.16(0.16) ; excretory pore to anterior end 0.65-0.72(0.66) ; tail 0.45-0.53(0.49) ; vulva to posterior end 0.72-0.80(0.77) ; vagina vera 0.25-0.34(0.31) ; egg 0.07-0.10(0.08)  $\times$  0.04-0.05(0.04). Tail long, slender, tapering ; vulva immediately anterior to anus ; vagina vera short, broad at anterior end ; vestibule obliquely disposed ; egg ellipsoidal.

## DISCUSSION

*P. thylogale* sp. n. is readily distinguished from congeners by the lack of a shelf in the buccal capsule, by the presence of a striated buccal capsule wall with a distinct annulus,

and the triangular mouth opening and buccal capsule. The latter characters occur in the genus *Macropostrongylus* Yorke & Maplestone, 1926, but have not previously been described in *Popovastrongylus*.

*P. thylogale* occurs commonly in *Thylogale stigmatica* (BEVERIDGE, unpublished observations) and was present in the only specimen of *T. brunii* examined. It apparently does not occur in *T. stigmatica* or *T. thetis* in southern Queensland (BEVERIDGE, unpublished observations). The parasite occurs also in *Petrogale persephone* in central Queensland, but this particular host harbours several nematode parasites which normally occur in *Thylogale* spp. and which are not normally found in other species of *Petrogale* (BEVERIDGE, 1983). *P. thylogale* appears to represent another example of this same phenomenon.

### **Popovastrongylus pearsoni** (Johnston & Mawson, 1940)

(Fig. 3)

MATERIAL EXAMINED : From *Macropus fuliginosus* (Desmarest, 1817) : 10 ♂, 10 ♀, Murray's Lagoon, Kangaroo Island, South Australia, 3.V.1984, coll. 1. BEVERIDGE (AHC no 13677 ; MNHN no 527HD) (new host record).

#### DESCRIPTION

Mouth opening quadrangular in apical view, surrounded by elevated, finely striated labial collar, indented at corners on external margin by submedian papillae ; amphids on extremely prominent lateral projections external to labial collar ; submedian papillae each with 2 short, medially directed setae ; cephalic collar present posterior to labial collar, bearing papillae and amphids. Buccal capsule approximately cylindrical in median and lateral views ; wall slightly thickened posteriorly ; internal lining of buccal capsule thick, transparent, folded in mid-region to produce irregular shelf-like projection, almost occluding lumen ; outer wall of buccal capsule sclerotised, refractile, thickened in posterior half, non-striated ; buccal capsule circular to slightly oval in transverse section, slightly laterally elongate.

#### DISCUSSION

*P. pearsoni* was initially described from *Petrogale lateralis pearsoni* Thomas, 1922, from Pearson Island, South Australia, and was redescribed from the same host and locality by MAWSON (1971). MAWSON (1977) gave additional differential features of the species and reported it from *Macropus rufogriseus* (Desmarest, 1817) from Tasmania and *Macropus eugenii* (Desmarest, 1817) from Kangaroo Island. The material described above was taken from *M. fuliginosus* on Kangaroo Island and constitutes a new host record. *P. pearsoni* is not known from *M. fuliginosus* on the mainland (BEVERIDGE and ARUNDEL, 1979) but occurs commonly in *M. eugenii* (SMALES and MAWSON, 1978) and it is therefore not surprising that it occurs in *M. fuliginosus* where the two macropodid species are sympatric.

MAWSON (1971) described the cephalic morphology of this species in detail. The above description confirms her findings and emphasises the symmetrical nature of the buccal capsule in transverse section and the presence of a shelf in the buccal capsule formed by the lining.

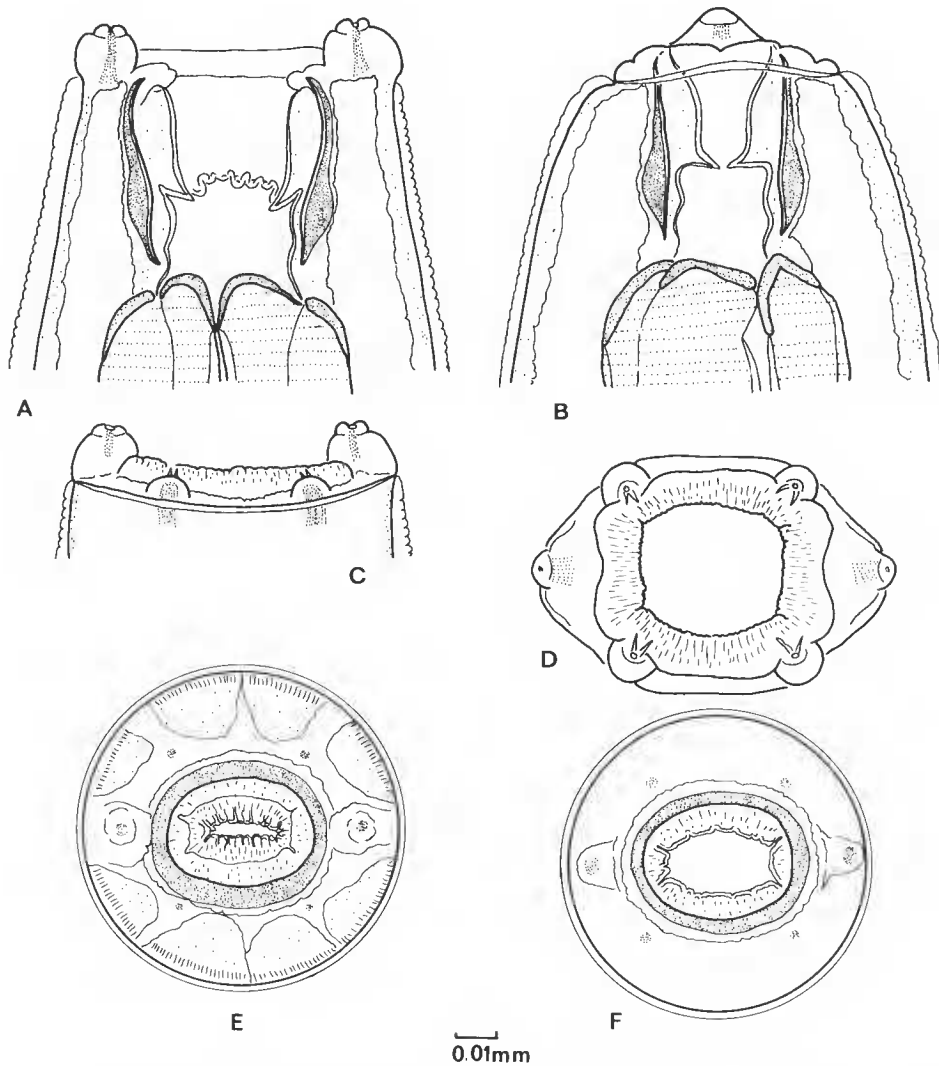


FIG. 3. — *Popovastrongylus pearsoni* (Johnston & Mawson, 1940) : A, cephalic end, median view ; B, cephalic end, lateral view ; C, cephalic papillae, median view ; D, mouth opening, apical view ; E, optical transverse section through buccal capsule at level of shelf ; F, optical transverse section through anterior part of buccal capsule showing thickened internal lining. (All figures to same scale.)



### CONCLUSION

The description of two new species of *Popovastrongylus* considerably alters the characteristics of the genus. All species have a bipartite buccal capsule wall, composed of a thick, inner transparent layer which forms a shelf in the lumen in *P. wallabiae* and *P. pearsoni*, and is greatly inflated in *P. macropodis* so as to virtually occlude the mouth opening, leaving only a small, triradiate opening. Similarly, the buccal capsule, which is circular in transverse section in all previously described species as well as in *P. macropodis*, is triangular in *P. thylogale*, and this introduces a new morphological character into the genus, which has been noted previously only in *Macropostrongylus*, *Trigonostonema* Beveridge, 1981, *Alocostoma* Mawson, 1979, and *Monilonema* Beveridge and Johnson, 1981. Because of the differences noted in the new species, an amended definition of the genus is given below.

Genus *Popovastrongylus* Mawson, 1977 (Cloacininae Stossich, 1899; Macropostrongylinea Lichtenfels, 1980). Mouth opening quadrilateral, triangular, or small and triradiate; 4 submedian papillae armed with setae and 2 amphids on conical projections borne on cephalic collar; labial collar present internal to cephalic collar; buccal capsule cylindrical, sclerotised, often with annular thickening; lining thick, transparent, inflated or forming shelf in lumen. Oesophageal corpus long, cylindrical; isthmus short; bulb sub-spherical without sclerotised plates in lumen; anterior extremity of intestine not thickened. Dorsal ray of bursa with 2 pairs of branches; gubernaculum absent. Vagina vera short; vestibule oblique. Parasitic in stomach of macropodid marsupials.

TYPE SPECIES : *P. wallabiae* (Johnston & Mawson, 1939).

OTHER SPECIES : *P. irma* Mawson, 1977; *P. macropodis* sp. n.; *P. pearsoni* (Johnston & Mawson, 1940); *P. thylogale* sp. n.

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